

**What is claimed:**

1. A method of oxidizing a semiconductor wafer characterized in that steam oxidation is initiated without first stabilizing the wafer in dry oxygen.

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2. The method of claim 1, where steam is introduced during heating to initiate steam oxidation and oxidants are employed with the steam.

3. The method of claim 2 where the other oxidants are comprised of any one of, or a  
10 mixture of any of: atomic oxygen (O), oxygen gas (O<sub>2</sub>), ozone (O<sub>3</sub>), nitrous oxide (N<sub>2</sub>O) and  
nitric oxide (NO).

4. The method of claim 1 further comprising the following steps:  
raising the temperature of the wafer in the presence of steam in a process chamber;  
15 and  
cooling the wafer.

5. The method of claim 1 wherein the steam oxidation is carried out at a temperature in  
the range of about 500°C to 1300°C.

6. The method of claim 4 wherein the temperature is raised at a ramp rate in the range of  
20 about 10°C/sec to 300°C/sec.

7. A method of oxidizing the surface of a semiconductor wafer in a process chamber,  
comprising the steps of:  
ramping the temperature of the wafer to an oxidizing temperature while conveying  
steam to the wafer, wherein the oxidizing temperature is in the range of about 500°C to  
25 1300°C.

8. The method of claim 7 wherein the method is carried out in a single wafer chamber.

9. The method of claim 7 wherein the method is carried out in a rapid thermal  
processing (RTP) chamber.

10. The method of claim 7 further comprising oxidizing the surface of the semiconductor  
30 wafer to form a dielectric layer thereon.